MINIMUM OPERATING POOL (MOP)

Minimum operating pool (MOP) is a term used to define the projects' lower operating range. For the MOP discussion below, the main stem run-of-river projects in the lower Columbia and Snake rivers (Bonneville, The Dalles, John Day, McNary, Ice Harbor, Lower Monumental, Little Goose and Lower Granite) will be addressed. Operation of these projects can not be held to one elevation due to uncontrolled runoff, wave action, precipitation, and powerhouse operations. Therefore, there is a range of operation identified when the term "MOP" is used. The projects and their facilities were designed to operate between MOP and full pool.

- *Reservoir Uses:*
    - Authorized uses include flood control, hydropower, navigation, irrigation, recreation, water quality and supply, and fish and wildlife.
    - Project operating ranges:

Project	*Maximum pool elevation*	*Minimum Pool elevation*
Bonneville	76.5	70.0
The Dalles	160.0	155.0
John Day	268.0	257.0
McNary	340.0	335.0
Ice Harbor	440.0	437.0
Lower Monumental	540.0	537.0
Little Goose	638.0	633.0
Lower Granite	738.0	733.0

    - Facilities include navigation locks and ports, powerhouses, adult and juvenile bypass, irrigation and recreational areas designed to operate at MOP or higher. For instance, adult ladder exits at Ice Harbor Dam are at elevation 431 (six feet below MOP), and the navigation lock upstream sill is elevation 422 (15 feet below MOP). Operating below MOP would eliminate the use of many of these facilities.

- *Before the ESA listings, run-of-river projects operated between MOP and full pool:*
    - John Day includes 534 kaf of flood control storage. Operating range is typically elevation 262.5 to 265 feet. John Day operates in the spring near elevation 265.0 feet twice each week for protection of geese during nesting (to avoid forming land bridges to islands). In the fall the reservoir operates near elevation 265.0 feet twice each week to enhance hunting conditions.
    - The Corps operates Bonneville pool at elevation 75.0 feet to 76.5 feet to enhance tribal fishing during commercial seasons in Zone 6. During the commercial season, The Dalles typically fluctuates about two to three feet. John Day operates within a 1.5 foot operating range that may vary with the season.
    - Run of river dams used the entire operating range available for power peaking.
    - Special navigation operations are met at McNary in the spring and fall as part of an Interagency Agreement with the Navy.

- *Changes which have been made to benefit fish since ESA listing*:

  - MOP operations decrease the cross-section area of the pools and increase water velocity (decreasing water particle travel time).
  - Since 1992, the four lower Snake River projects have been operated at MOP (with an operating range of one foot above MOP) from April 3 until small numbers of juvenile migrants are present (generally August 31, except for Lower Granite). Lower Granite operates at MOP until natural cooling occurs in the forebay, generally after October 1.
  - Since 1992, John Day operates at elevation 262.5 feet to 264.0 feet starting April 10 until higher pool elevations are necessary for irrigation through September 30.
  - Limiting the lower Snake River dams operating ranges to one foot has limited those project's ability to peak for power needs.

- *Studies and resultant operational changes since the ESA listings:*
  - The 1992 Columbia River Salmon Flow Measures Options Analysis/Environmental Impact Statement (OA/EIS) examined operating run-of-river projects at and below MOP. Impacts considered included fish and wildlife, navigation, hydropower, cultural resources, irrigation, recreation, and air and water quality. Followed by a Supplemental EIS, 1993.
  - The 1992 Reservoir Drawdown Test, Lower Granite and Little Goose Dams, December 1993 documented the physical impacts of the 1992 drawdown test.
  - Several studies were conducted to evaluate operating John Day at various elevations down to and below MOP. These included John Day Reservoir Minimum Operating Pool Technical Report dated April 1994.
  - System Operations Review EIS, November 1995 examined operational impacts from several strategies including fixed drawdowns of several main stem run-of-river projects.
  - Lower Snake River Juvenile Salmon Migration Feasibility Study, February 2002, examined removal of the four lower Snake River dams and other means of safely passing juvenile migrating salmon.